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Results
of
Dr. E. Mjöberg's
Swedish Scientific Expeditions
to
Australia 1910—1913.

18.

Neuroptera and Mecoptera

by

P. ESBEN-PETERSEN.

With 3 Plates and 15 Figures in the Text.

Communicated May 8th 1918 by Chr. Aurivillius and Y. Sjöstedt.

It has given me great pleasure to work out the material from the expeditions of Dr. E. Mjöberg. The Australian Neuropterous fauna contains so many archaic and peculiar forms, that their study will always bring an enrichment of knowledge.

My best thanks are due to Prof. Dr. Yngve Sjöstedt and Dr. E. Mjöberg for the opportunity of looking through the interesting material, but I am further very much indebted to Prof. L. Krüger, Stettin, and I wish to bring him my best thanks here. His publications concerning systematical Neuropterology have opened my eyes for the true and correct apprehension of the nervature of the wings in the *Neuroptera*, and his accurate and careful method of working has been exceedingly impulsive to me.

A. Neuroptera.

The three following families are closely allied and form together with the *Osmylidae* (not present in this collection and therefore not mentioned here) a rather independent group within the *Neuroptera.* If we deal especially with the nervature of the wings, we find that the *Nymphidae* may be looked upon as the most primitive or the eldest family. In this family we have no coalescence of the main-nervures. In the subcostal area numerous cross weins are present. *Rs*

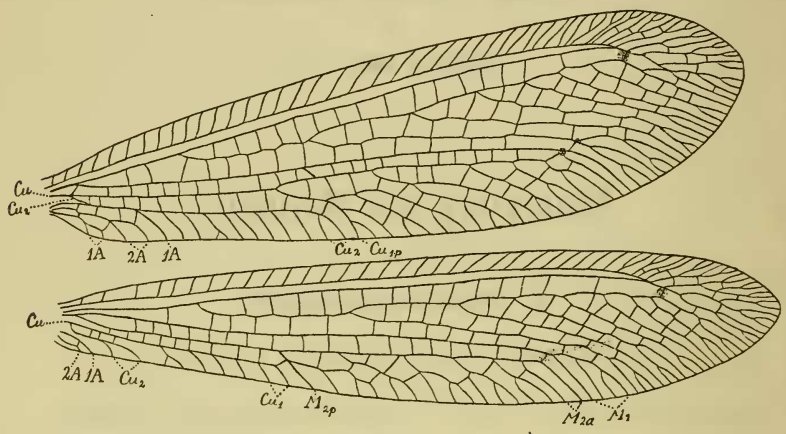

Fig. 1. Wings of *Chrysoleon punctatus.*
(Below the forewing read from left to right *3 A*, *2 A*, *1 A* for *1 A*, *2 A*, *1 A.*)

arises close to the base of the wing, and it emits numerous branches. *M* is forked at some distance from the base of the forewing, but at the base in the hindwing. In the hindwing M_2 gives off from its apical part a long series of branches to the hind margin. *Cu* forks close to the base in both pairs of wings. In the forewing Cu_1 (and sometimes also Cu_2) is branched in the same peculiar manner as M_2 in the hindwing. *1 A*, *2 A* and *3 A* present, at least in the forewing. In the *Ascalaphidae* and the *Myrmeleonidae* the crossweins in the subcostal area are lacking. *Rs* arises further out in the forewing. *M* is apparently unforked in the forewing; but as stated concerning the *Myrmeleonidae* it is due to the fact that M_2 in its free basal part only has the appearance of a

crossvein. The same is undoubtedly the case also concerning the *Ascalaphidae*. *M* is forked in the hindwing in the same manner in these two families as in the *Nymphidae*. With regard to *Cu* in the forwing we find in the *Ascalaphidae* that Cu_2 is free, but running parallel, and very close to *1A*; in the *Myrmeleonidae*, however, Cu_2 is visible in its basal part as a short and weak nervure, then it coalesces with *1A* for a distance but it becomes free in its apical part. The *Archæmyrmeleonidae*[1] occupy an exceptional position in this respect; in this group Cu_2 is not coalescing with *1A* in the forewing, and it seems to me that this group ought to have rank of a family.

I. Nymphidae.

Nymphes myrmeleonides Leach, Zool. Misc. I, p. 102, pl. 45. — A fine series of this beautiful insects was present from Queensland. 7 specimens, Atherton; 2 specimens, Lamington Plat; 1 specimen, Herberton; 1 specimen, Colosseum; 1 specimen, Cedar creek.

Myiodactylus osmyloides (pl. 1, fig. 1) Brauer, Verhandl. zool.-bot. Gesellsch., Wien, p. 991, 1866. — One specimen from Herberton, Queensland, January.

It seems to be a very scarce insect; I have only seen three specimens.

II. Ascalaphidae.

Suphalasca dietrichiae Brauer, Verhandl. zool.-bot. Gesellsch., Wien, p. 15, 1869. — Three specimens from Kimberley district, N. W. Australia, February, and one specimen from Atherton, Queensland, January.

Suphalasca inconspicua Mac Lachlan, Journ. Linn. Soc., London, p. 256, 1871. — One female specimen from Kimberley district, N. W. Australia, February.

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[1] Esben-Petersen, Ent. Medd., Köbenhavn, p. 100, 1918.

III. Myrmeleonidae.

As far as I know only the *Neomyrmeleonidae* are represented in the Australian fauna; but here we meet with many old and interesting forms. In continuation of my paper »Help-notes towards the determination and the classification of the European Myrmeleonidae»[1] I give here in a short and tabular form my view with regard to the systematic of the Australian fauna, but only concerning the material here present.

1. *Rs* in the hindwing arises close to base of wing and always before fork of M_2. Only one (very seldom two) crossvein in the radial area before origin of *Rs*.
Dendroleoninae 2.

— *Rs* in the hindwing does not arise so close to base of the wing and always further out than the fork of M_2. Two or more crossveins in the radial area before the origin of *Rs*. *Myrmeleoninae* 4.

2. In the forewing *Rs* arises before or just above the fork of Cu_1. The free basal part of Cu_2 as a rule rather long; two or three crossveins between this part and Cu_1. *2 A* and *3 A* not coalescing. In the hindwing *2 A* is always present and distinct. One crossvein between *1 A* and *2 A*.
Dendroleonini.

— In the forewing *Rs* arises further out than the level of the fork of Cu_1. The free basal part of Cu_2 short; mostly only one crossvein between this part and Cu_1. *2 A* and *3 A* coalesce at a point or for some distance. In the hindwing *2 A* is sometimes present, but not very distinctly. Between *1 A* and *2 A* no crossvein present. . . . . 3.

3. Cu_{1p} and Cu_2 in the forewing are running parallel with Cu_{1a} and with the hind margin of the wing. *Creagrini.*

— Cu_{1p} and Cu_2 do not run parallel to Cu_{1a} or to the hind margin. *Formicaleonini.*

[1] Ent. Medd., Köbenhavn, p. 97, 1918.

4. In the hindwing *2 A* is present as a short thickened nervure, distinctly separate from the hind margin; its apical part is curved upwards, and it ends into *1 A*. Body and legs stout and strongly haired. *Acanthaclisini.*

— In the hindwing *2 A* is mostly running directly into the hind margin and therefore not observable (in *Callistoleon* *2 A* is running free of the hind margin as a weak nervure, and it ends into *1 A*). Body and legs not very stout or haired. *Myrmeleonini.*

1. Dendroleonini.

This tribe seems to be very well-represented in the Australian fauna, apparently better there than in any other fauna of the world. Later on a sub-division may probably be necessary. The genera *Austrogymnocnemia* and *Acanthoplectron* occupy a special position in the tribe.

Key to the genera here mentioned.

1. *Rs* arises long before fork of Cu_1 in the forewing and long before fork of M_2 in the hindwing . . . . . 2.

— *Rs* arises above fork of Cu_1 in the forewing and just before fork of M_2 in the hindwing. . . . . 5.

2. Hind margin of the wings with one or two excavations. Wings with brownish black or golden shining spots or bands. *Periclystus.*

— Hind margin of the wings without excavations. No golden shining spots or bands. 3

3. Spurs present. 4

— Spurs absent. Forewings a little shorter than hindwings and with rounded apex. Nervature very dense. Anterior Banksian line present in the forewing. *Chrysoleon.*

4. The direction of Cu_2 in the forewing undulating. Anterior Banksian line present. Rather broad-winged species. *Glenoleon.*

— The direction of Cu_2 in the forewing straight; the apical part curved downwards to the hind margin. Narrow-winged species. *Anomaloplectron.*

5. Banksian lines present; the posterior one not very distinct in the hindwing. Spurs absent (microscopical). *Austrogymnocnemia.*

— Banksian lines absent. Spurs present. *Acanthoplectron.*

The following Australian genera, known to me, may be included in this tribe: *Dendroleon* BRAUER, *Froggattisca* ESB.-P. and *Ceratoleon* ESB.-P.

Periclystus circuiter WALKER, Cat. Neur. Ins. Brit. Mus., p. 400, 1853. — One specimen of this fine and peculiar insect was present from Colosseum, Queensland.

Two further species, *laceratus* GERST. and *aureolatus* TILL., are known from Australia.

Chrysoleon punctatus (Fig. 1) BANKS, Ann. Ent. Soc. Amer., p. 43, 1910. — Queensland: 1 specimen, Cape York. N.W. Australia: 2 specimens, Kimberley district, and 1 specimen, Derby.

No other species, belonging to this genus, are known.

Glenoleon.

BANKS, Trans. Amer. Ent. Soc., p. 223, 1913.

Rs arises before the fork of Cu_1 in the forewing. The free basal part of Cu_2 rather short. Cu_2 coalesces with *1 A* when it reaches the basal crossvein emitted from Cu_1. The free apical part of Cu_2 curved or undulating. *2 A* simple and unforked, connected with *1 A* by at least three crossveins. *3 A* does not coalesce with *2 A*, but it is forked close to the margin, and it is connected to *2* A by two crossveins, the basal one is very short. In the hindwing Cu_3 is forked. *1 A* simple. *2 A* present and simple. *1 A* and *2 A* connected by a crossvein close to their end. Legs rather long and slender. Apical tarsal joint longer than basal joint. Spurs as long as or a little longer than basal tarsal joint.

Genotype: *Myrmeleon pulchellus* RAMB.

Glenoleon pulchellus RAMBUR, Hist. nat. Ins. Névropt., p. 408, 1842. — Two specimens, Lamington Plat, Queensland.

Glenoleon osmyloides GERSTAECKER, Mitth. naturw. Verein f. Neuvorp. u. Rügen, p. 27, 1884. *Glenoleon annulicornis* ESBEN-PETERSEN, Proc. Linn. Soc. N. S. Wales, p. 72, pl. 6, fig. 5, 1915. — One specimen, Derby, N. W. Australia, October.

Glenoleon annulatus n. sp. (pl. 1, fig. 2). — Head and palpi yellowish. Tip of mandibles blackish. A dark spot below the base of each antenna; these two spots are connected by a narrow dark streak. Above each antenna two small dark dots. Two dark narrow longitudinal median streaks on the front part of the vertex. Several spots and streaks on the hind part of the vertex. Antennae brownish with yellowish annulations; underside of club mostly yellowish. Thorax yellowish, dark-spotted. Prothorax broader than long. Abdomen yellowish; the apical half part of the abdominal segments dark dorsally. Legs yellowish. Femora blackish annulated at their middle and their apex. Tibiae with three blackish bands; the one at apex. Third and fourth tarsal joint and tip of fifth joint blackish. Wings broad and with obtuse and rounded tip. Nervature yellowish; blackish banded. Several of the crossveins entirely yellowish; a few totally black but the greatest number, especially in the forewing, blackish at one end or at both ends. Where the blackish end of a crossvein touches the longitudinal nervure, this is blackish banded. *R* and Cu_{1a} in the forewing distinctly blackish banded. In the subcostal area of the forewing 5 or 6 longitudinal brownish streaks. Pterostigma with a small brown spot. A brownish spot behind

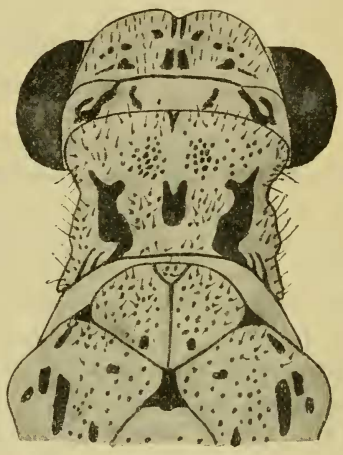


Fig. 2. Head, pro- and mesothorax of *Glenoleon annulatus*.

the pterostigma in the forewing close to the end of *M* and Cu_{1a}. Anterior Banksian line distinct.

Length of forewing 32 mm; that of hindwing 29 mm. One specimen in alcohol from Cape York, Queensland.

Austrogymnocnemia bipunctata Esben-Petersen, Proc. Linn. Soc. N. S. Wales, p. 63; pl. 6, fig. 3, pl. 9, fig. 13, 1915. — One specimen in alcohol from Mt. Anderst, N. W. Australia, 9. Novbr. 1910.

I know the species only from N. S. Wales.

Anomaloplectron n. g.

Wings long and narrow and with obtuse apex. Costal area in the forewing gradually broadened from base towards the origin of *Rs;* from that point to the pterostigma of the same breadth; all the crossveins simple; no crossveins in the apical area. *Rs* arises close to the base of the wing; only two crossweins in the radial area before its origin. No Banksian lines. Most of the cells in the discal area of the wing oblong and rectangular. *M* and Cu_1 fork at the same level and much further out than origin of *Rs*. The free basal part of Cu_2 rather long. Cu_2 runs parallel to the stem of Cu_1 and ends directly into the hind margin. *2A* and *3A* separate; connected by two crossveins. *2A* unforked; *3A* very strong and forked close to the hind margin. In the hindwing the costal area is almost of the same breadth from base to the pterostigma; all the crossveins simple. No crossveins in the apical area. *Rs* arises close to the base of the wing; only one crossvein in the radial area before origin of *Rs*. Cu_1 parallel to the stem of M_2 and ends directly into the hind margin. *1A* and *2A* not coalescing, but connected by a crossvein. Apical joint of labial palpi very stout and broad, pointed towards tip. Fore legs short and very stout, especially the femora; tibiae stout, shorter than femora; tarsi as long as tibiae; spurs longer than first, second, third and fourth tarsal joint united. Intermediate legs not so stout as fore legs, but the length of femora, tibiae and tarsi is comparatively the same, only the spurs are short, a little longer than first tarsal joint. Hind legs more slender; tibiae only

a little shorter than the femora, and the tarsi are also a little shorter than the tibiae; the spurs very short, hardly half the length of basal tarsal joint. The abdomen about of the same length as the forewing.

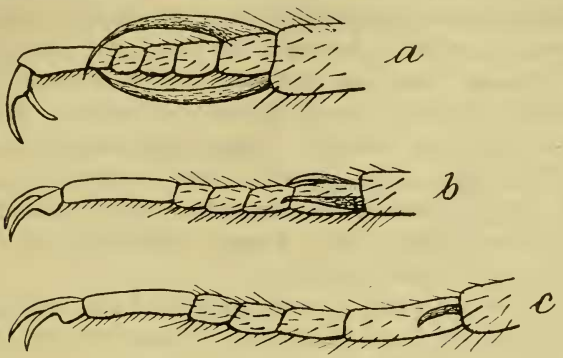


Fig. 3. *Anomaloplectron lineatipenne.*
a fore leg; *b* intermediate leg; *c* hind leg.

Genotype: *Anomaloplectron lineatipenne* n. sp.

This genus is a very interesting one. It is quite certainly an archaic form; the origin of *Rs* in the forewing is very close to the base, and *2 A* and *3 A* are separate and well developed; but the most surprising feature is the peculiar shape of the spurs. As far as I know, it is quite exceptional in the *Myrmeleonidae*. The generic name indicates the fact.

Anomaloplectron lineatipenne n. sp. (pl. 1, fig. 3). — Face reddish yellow. A blackish spot between the antennae; three large blackish spots are placed rectangularly on the upper part of the face; three smaller ones on the lower part. Labrum red. Palpi yellowish; apex of mandibles blackish. The vertex rather raised. Above the antennae a blackish crossband; on the top of vertex a blackish transverse band, the hind margin of which is irregular. On the hind part of vertex some small blackish spots. The basal part of antennae yellowish brown (the rest of antennae lost). Prothorax a little longer than broad; yellowish brown with three irregular dark longitudinal streaks, the middle of which is forked in

front. Front margin of prothorax semicircular. A transverse furrow one third from the front margin; the furrow hardly reaches the lateral margins. Meso- and metathorax blackish, dorsally and ventrally, and with reddish brown streaks and spots. Abdomen brownish yellow with blackish lateral margins and with some irregular dark spots above. Legs yellowish brown to reddish brown; the hind pair paler than the others. Femora blackish; the fore and the intermediate ones with a reddish brown streak above and below. Tibiae with a blackish band at the tip. Legs, especially the fore ones, with whitish hairs, mingled with some blackish ones. Membrane of wings hyaline; nervature brownish to blackish with whitish interruptions. The wings, especially the forewings, with long sooty brown streaks.

Length of forewing 16 mm; that of hindwing 14 mm.

One specimen from Kimberley district, N. W. Australia, May.

Acanthoplectron n. g.

Wings long and slender, gradually broadened towards apex, which is rather obtuse. Costal area in the forewing narrow and of the same breadth from base to the pterostigma; some few crossveins before pterostigma forked. Apical area with a few crossveins, arranged in one row. *Rs* arises at the level of the fork of Cu_1. Three crossveins in the radial area before the origin of *Rs*. No Banksian lines. The angle between Cu_{1a} and Cu_{1p} very acute. Cu_2 straight. *2 A* and *3 A* separate and only connected by a very short crossvein; they are running close to each other from base to the connection by the crossvein. *2 A* unforked; *3 A* forked. The costal area in the hindwing of the same shape as in the forewing. Some few crossveins in the apical area. Two crossveins before origin of *Rs*. *1 A* and *2 A* present; one crossvein between them. Legs short and stout; femora and tibiae of the same length; tarsi of fore legs as long as tibiae, of hind legs a little shorter. Spurs stout, almost bent in a right angle and with a pointed dent internally. Spurs as long as three or four tarsal joints united. The fifth joint about as long as the four others united. Abdomen as long as the forewing.

Genotype is the below described species.

Acanthoplectron tenellum n. sp. (pl. 1, fig. 4). — Face and palpi yellowish brown; labrum yellowish. Vertex somewhat raised. Above the antennae, which are lost, a blackish brown transverse band, which also occupies the area between the antennae. Upper and hind part of vertex blackish brown. Prothorax quadratic; front angles hardly rounded; greyish brown with an oblique yellowish streak at each side, reaching from the front angle to the hind margin. Meso- and metathorax brownish black with indistinct pale spots and yellowish hind margin. Abdomen brownish black with yellowish pleurae and pale narrow hind margins of the segments dorsally. Thorax with long whitish, and abdomen with short whitish hairs. Femora brown; tibiae yellowish with brown apex, and with a brown spot about in the middle of the fore and the intermediate ones; hind tibiae without spot, but with a brown streak along the underside. First tarsal joint yellowish; fifth yellowish with blackish brown apex. Claws and spurs brownish. Legs whitish haired. Nervature of wings blackish with whitish interruptions. Pterostigma small and yellowish. Length of forewing 20 mm; that of hindwing 19 mm.

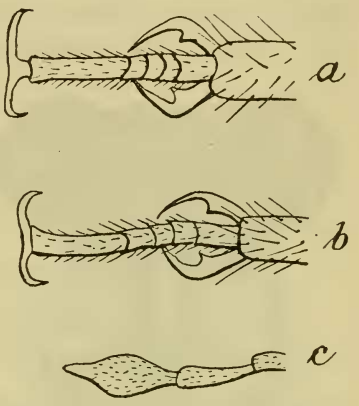


Fig. 4. *Acanthoplectron tenellum.* *a* fore tarsus; *b* hind tarsus; *c* labial palpi.

One female specimen from Kimberley district, N. W. Australia, November.

2. Creagrini.

Protoplectron pallidum Banks, Ann. Ent. Soc. Amer., p. 41, 1910. — Queensland: 1 specimen, Cooktown, September; 1 specimen, Cape York, August. N. W. Australia: 4 specimens, Kimberley district, February.

Protoplectron gerstaeckeri n. sp. (pl. 1, fig. 6). — Face yellowish. Tip of mandibles blackish. Apical joint of palpi

blackish. Vertex blackish, and the black colour extends below the antennae, forming a transverse band. Four yellowish spots on the vertex. Antennae at least as long as head and thorax together, dark and with a yellowish band at the tip of each joint; the club only sligthly thickened but regularly yellowish banded. Prothorax broader than long, dark brown, with pale narrow median streak and partly pale lateral margins. The margins with long white hairs mingled with blackish. Mesothorax brownish black with several longitudinal pale spots or streaks. Metathorax brownish black with two pale spots dorsally. Abdomen uniformly blackish brown above and pale below; apical segment pale above and with black bristles. Femora pale brown and with darker brown sides. Tibiae brown with blackish tip and blackish median band. Tarsi blackish. Legs with long blackish hairs, mingled with whitish. The nervature of the wings much alike to that of *P. venustum* GERST.; but the crossveins in the forewing hardly so strongly margined with black. Two rows of cells in the basal half part of the costal area of the forewings. One row of cells between Cu_{1p} and Cu_2 in the forewing. No anterior Banksian line; the posterior one rather distinct.

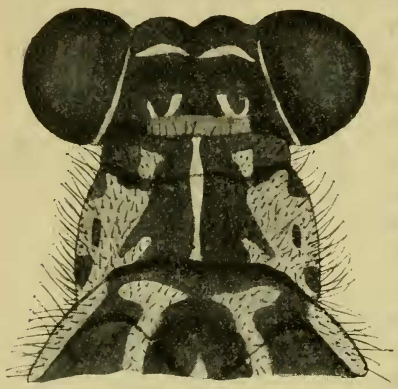


Fig 5. *Protoplectron gerstaeckeri.*

Length of forewing 30 mm; that of hindwing 28 mm.

One specimen in alcohol from Cape York, August.

I name the species after the late German Entomologist GERSTAECKER, who has done so much in exploring the Neuropterous fauna of Australia.

In this species Cu_{1p} is only sub-parallel to Cu_{1a}, and the area between Cu_{1a} and Cu_{1p} is not as long as usually in the genus. As to the shape and length of femora, tibiae, tarsal joints and spurs the species agrees exactly with *P. venustum* GERST.

Mjöbergia n. g.

Wings rather long and slender and with acute tip. The costal area in the forewing with two or three irregular rows of cells in its basal two thirds part. *Rs* arises further out than the fork of Cu_1. *M* and Cu_1 fork opposite to each other. The free basal part of Cu_2 very short. *2A* and *3A* fuse in a point; both are forked. Cu_{1a} and Cu_{1p} run parallel to Cu_2 and to the hind margin. Anterior and posterior Banksian line present. The nervature very dense and irregular. In the hindwing the costal area has one row of cells. *Rs* arises close to the base of the wing; one regular and one irregular crossvein before its origin. Anterior Banksian line present. *1A* short and bent in the shape of a right angle. Legs short and stout. Tibia two thirds the length of femur. Tarsus about twice as long as tibia. First tarsal joint a little longer than fifth, which is as long as second, third and fourth united. Spurs straight, and as long as first tarsal joint.

Genotype the below described species.

The genus is nearly allied to *Protoplectron*, but the shape of the wings and the density and irregularity of the nervation offer good and distinct generic characters. The genus may be regarded as a highly specialized one within the *Creagrini*.

Mjöbergia fulviguttata n. sp. (pl. 1, fig. 7). — Head and thorax reddish yellow. A broad blackish band from eye to eye, enclosing the insertions of the antennae. Tip of the apical joint of the palpi and of the mandibles dark. Antennae close together at their base, as long as head, pro- and metathorax together, blackish, yellowish annulated at the joinings; the club distinct, almost completely yellowish ventrally. Prothorax a little longer than broad, reddish yellow and without markings; front angles rounded; a very deep transverse furrow one third from front margin. Mesothorax reddish yellow. Metathorax reddish yellow (in a matured specimen powdered with white) and with two brown spots close to the front margin. Abdomen greyish yellow, a little darker towards apex (in the adult specimen the abdomen is dark brown with narrow yellowish hind margin of each seg-

ment dorsally). Thorax and abdomen whitish haired. Femora and tibiae reddish yellow; the tibiae with brownish apex. Tarsi blackish brown; the spurs brownish. Claws rather long and slightly curved in their apical part, each of them provided with a rather large dent in the middle ventrally; the tip of each dent cleft. Legs with long whitish hairs, mingled with blackish, especially ventrally. Membrane of wings hyaline; nervature pale, except where the forewings are spotted. The spots on basal third part of the forewing brownish black, on the rest brownish yellow. *R* with a black streak, where it touches the spots. Pterostigma greyish yellow, with a dark spot at its base; in the hindwing rather indistinct.

Length of body 29—33 mm; that of forewing 32—38 mm; that of hindwing 30—35 mm.

Four specimens are present from Kimberley district, N. W. Australia, Febr.—March.

3. Formicaleonini.

Distoleon verticalis (pl. 1, fig. 5) BANKS, Ann. Ent. Soc. Amer., p. 42, 1910. — One specimen in alcohol from Cape York, September. Length of forewing 27 mm; that of hindwing 26 mm.

I refer the specimen to the above named species although there seems to be some small differences as to the markings on the head. The genus *Distoleon* BANKS (loc. cit.), the genotype of which is *verticalis*, is nearly allied to the genus *Formicaleon*. The free basal part of Cu_2 in the forewing is rather short, and it coalesces with *1 A* when it reaches the first crossvein emitted from Cu_1. *2 A* and *3 A* coalesce for a short distance. *2 A* is simple; *3 A* forked. In the hindwing *1 A* is simple as in *Formicaleon*. *2 A* not present. No Banksian lines.

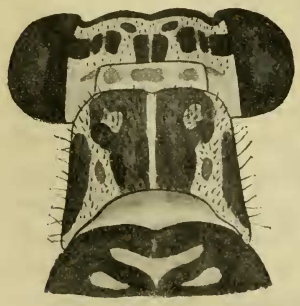


Fig. 6. *Distoleon verticalis.*

Fig. 7. Abdomen of *Distoleon verticalis.*

Distoleon differs from *Formicaleon* only with regard to the greater length of spurs. It seems to me that this difference is only of subgeneric value. BANKS places *Myrmeleon bistrigatus* RAMB. in *Distoleon*, but this is not correct. *2 A* is present in the hindwing of *bistrigatus* and *nigrosignatus* TILL.; it is short and runs almost along with the hind margin; between *1 A* and *2 A* one crossvein, whereby an almost circular and rather conspicuous cell is formed, in likeness to what takes place in the *Acanthaclisini*.

I erect the following genus to include the above named species, and I consider *M. bistrigatus* RAMB. as geno-type.

Eidoleon n. g.

Wings long and slender, pointed at apex. Hindwing as long as forewing. Costal area of forewing a little narrowed at base, for the rest so far out as to the pterostigma of same breadth. Apical area with one regular series of crossveins. *Rs* arises a little further out than fork of Cu_1. Anterior Banksian line present. The angle between Cu_{1a} and Cu_{1p} acute. Posterior Banksian line distinct, forming a continuous line of the recurrent nervure, arising from the end of Cu_{1p}. The free basal part of Cu_2 rather short; only one crossvein from Cu_1 to this part of Cu_2. *2 A* and *3 A* coalesce for a distance. *2 A* unforked; *3 A* forked. The costal area in the hindwing of the same shape as in the forewing. The apical area with one regular series of crossveins. *Rs* arises close to the base of the wing. No Banksian line in the hindwing. Between M_{2a} and the hind margin 3 rows of cells basally, 2 rows apically. *1 A* present. *2 A* present; it is short and runs along with the hind margin; a crossvein present between *1 A* and *2 A*. This crossvein is often like a branch from *1 A*. Basal joint of tarsus short, twice as long as second joint; second, third and fourth joint very short; fifth joint as long as the four other joints united. Spurs as long as the first, second, third and fourth joint united.

Eidoleon bistrigatus RAMBUR, Hist. nat. Ins. Névropt., p. 391, 1842. — Queensland: 1 specimen, Colosseum; 2 specimens, Christmas creek. N. W. Australia: 2 specimens, Kimberley district.

It is a wide-spread species.

Heteroleon n. g.

Wings narrow, pointed at apex. Costal area of the same breadth from base to the pterostigma; none of the costal crossveins forked. A few crossveins present in the apical area. *Rs* arises further out than the fork of Cu_1, but before end of Cu_2. The angle between Cu_{1a} and Cu_{1p} acute. Third branch from Cu_{1a} arises without the angular area. The free basal part of Cu_2 short. *2 A* and *3 A* coalesce for a short distance. *2 A* unforked; *3 A* forked. Costal area in the hindwing equally broad from base to the pterostigma. No crossveins in the costal area forked. None or very few crossveins in the apical area.[1] One crossvein in the radial area before origin of *Rs*. *1 A* simple. *2 A* short, running parallel and close to the hind margin until it coalesces with *1 A*. Two rows of cells between M_{2a} and the hind margin. No Banksian lines. Legs rather short and slender. Basal tarsal joint short, as long as second and third united; second, third and fourth joint very short; fifth almost as long as the four other joints united. Spurs about as long as first and second tarsal joint united.

Genotype: *H. exilis* n. sp.

This genus has great likeness to the European genus *Nelees*, but it differs from that especially with regard to the presence of *2 A* in the hindwing. *Formicaleon marginalis* Banks may also be included in the genus.

Heteroleon exilis n. sp. (pl. 3, fig. 1). — Head blackish brown. The lower part of the face yellowish with a short brownish longitudinal band, which ends at the clypeus (in the one specimen this streak is very slightly indicated). Palpi yellowish. Tip of mandibles dark brown. The vertex raised and with a short longitudinal median furrow in front. Antennae hardly as long as head and thorax together, strongly clavate, yellowish brown, with dark tip and with the two basal joints dark banded (the basal one only on its underside). Prothorax as long as broad, somewhat narrowed in front and with rounded front angles; greyish brown with a yellowish irregular median longitudinal streak and with an irregular

[1] In the two present specimens of *H. exilis* is found one crossvein in the apical area of the one hindwing, none in the other hindwings.

yellowish front and lateral border. Meso- and metathorax greyish brown with yellowish hind margin. The underside of thorax yellowish; the lateral margins of thorax below the wings with a broad greyish brown streak. Abdomen brown with yellowish apex and pleurae; each segment with a narrow yellowish hind margin dorsally and ventrally. Legs yellowish with black bristles. Spurs pale brown, almost as long as the two first tarsal joints united. First tarsal joint hardly as long as second, third and fourth united; fifth joint a little longer than the same three joints united. Wings long and slender with acute tips. Membrane hyaline; nervures whitish; pterostigma hardly visible. In the hindwing is found a brownish streak, starting from the last crossvein between M_1 and M_{2a} and running parallel to the hind margin about two thirds the way towards the tip of the wing. No Banksian lines in the wings. Length of forewing 21 mm; that of hindwing 20 mm.

Two specimens, Kimberley district, N. W. Australia, December.

Heteroleon marginalis (pl. 2, fig. 2). BANKS, Ann. Ent. Soc. Amer., p. 44, 1910. — One female specimen, Kimberley district, N. W. Australia, and one specimen, tip of abdomen lost, from the same place.

4. Myrmeleonini.

Myrmeleonellus n. g.

Antennae distinctly clavate. Wings rather narrow at base. In the forewing *Rs* arises a little further out than the fork of Cu_1. The angle between Cu_{1a} and Cu_{1p} rather acute; Cu_{1p} somewhat curved towards base of wing apically. No anterior Banksian line; posterior Banksian line distinct. One row of cells in the basal half part of the area between Cu_{1a} and the Banksian line, two irregular rows in the apical half part. *2A* forked at apex; *3A* coalesces with *2A* for a long distance; *3A* is unforked. A series of crossveins present in the apical area. In the hindwing *Rs* arises further out than the fork of M_2; five crossveins in the radial area before the origin of *Rs*. Three rows of cells in the basal half part of

the area between M_2 and the hind margin, two rows in the apical part. Cu_2 and *1 A* unforked. No Banksian lines present. A few crossveins present in the apical area. Basal tarsal joint one and a half times longer than second joint; fifth joint as long as second, third and fourth united. Spurs a little longer than first tarsal joint. Abdomen a little shorter than the hindwing.

Geno-type is the below described species.

This genus is easily recognized by the unforked Cu_2 in the hindwing.

Myrmeleonellus pallidus n. sp. (pl. 2, fig. 3). — Face reddish yellow. Inner margin of mandibles blackish. Palpi yellowish. Vertex much raised, reddish yellow and with a few transversely placed reddish brown indistinct spots. Antennae pale brown. Prothorax as long as broad, yellowish and with rounded front angles. Two rather broad brownish longitudinal streaks, separated by a narrow yellowish median streak; these two brown streaks continue on the meso- and metathorax, but more widely apart. Two short and narrow streaks are yet found on the dorsum of metathorax. Sides of meso- and metathorax below the wing-roots more or less blackish. Abdomen dark brown; pleurae paler. Legs pale brown with blackish bristles. Membrane of wings hyaline. Costa and the apical half part of the hind margin blackish; the other nervures and all the crossveins pale brown.

Length of body 20 mm; that of forewing 21; that of hindwing 19 mm.

Two specimens from Kimberley district, N. W. Australia, February.

Leptoleon n. g.

Body rather short. Antennae distinctly clavate. Prothorax short and broad. Legs short and robust. First tarsal joint one and a half times as long as second; fifth joint as long as the four others united. Spurs a little longer than basal tarsal joint. Wings rather long and slender, gradually widened towards pterostigma; the tips of the wings rather obtuse. *Sc* and *R* in all the wings and in the forewing Cu_1 also very conspicuous, blackish and with pale annulations.

All the crossveins before pterostigma in the costal area are simple; in the apical area they are forked. One row of crossveins in the apical area of the forewing, none in the hindwing. *Rs* arises in the forewing further out than the level of fork of Cu_1. Anterior Banksian line not present. The angle between Cu_{1a} and Cu_{1p} very acute. Posterior Banksian line present and very distinct; one row of cells between Cu_{1a} and the Banksian line. About five crossveins before the origin of *Rs* in the hindwing. Anterior Banksian line absent, posterior line present and very distinct; one row of cells between M_{2a} and this line. Cu_2 forked. *1 A* present and unforked; *2 A* coalesces with the hind margin, which is thickened. A crossvein between *1 A* and the hind margin (*2 A*).

Geno-type is the below described species.

Leptoleon regularis n. sp. (pl. 3, fig. 3). — Head blackish brown with a narrow yellowish lateral streak along the margin of eyes in front and behind. Labrum and clypeus yellowish. Labial and maxillary palpi yellowish brown; apical joint of labial palpi almost black. Face shining brown. Vertex raised, not glossy, with shining blackish streaks and spots. Antennae strongly clavate, pale brown and with darker annulations; base of first joint yellowish. Prothorax about twice as broad as long, dull brown, with paler front and lateral margins and with rounded front angles. Meso- and metathorax brownish black with yellowish hind margin. Abdomen blackish with short pale hairs. Legs short and stout, with blackish bristles. Front femora and tibiae blackish brown, dorsally yellowish with a longitudinal brown streak. Intermediate and hind femora blackish brown with yellowish tip; intermediate and hind tibiae blackish brown ventrally, yellowish dorsally. Tarsal joints yellowish with dark apex. Spurs almost straight; each pair unequal in length. The inner spur of the fore legs as long as the two first tarsal joints united; the inner spur of the intermediate legs hardly as long as the first and the second joint together; the outer spur of hind legs as long as the first tarsal joint. Membrane of wings hyaline. Nervures pale yellowish, strongly dark banded. *Sc*, *R* and Cu_1 in the forewing are very conspicuous; in the hindwing only *Sc* and *R*. Pterostigma not very di-

stinct, especially in the hindwing; at the inner margin a small inconspicuous dark spot. No markings on the wings.

Body 21 mm; forewing 22 mm; hindwing 20 mm.

Two specimens, Kimberley district, N. W. Australia, March; the one specimen very immature.

Myrmeleon uniseriatus GERSTAECKER, Mitth. naturw. Ver. f. Neuvorp. u. Rügen, p. 29, 1884. — Queensland: 1 specimen, Atherton, January; 1 specimen, Colosseum, October; 1 specimen, Glen Lamington, November. N. W. Australia: 1 specimen, Kimberley district.

Myrmeleon pictifrons GERSTAECKRR, loc. cit., p. 13, 1885. — Queensland: 1 specimen, Cedar creek. N. W. Australia: 1 specimen, Derby, October; 1 specimen, Kimberley district, January.

Myrmeleon croceus n. sp. (pl. 2, fig. 1). — Head shining black. Labial and maxillary palpi black, joinings paler. Front border of clypeus pale. Antennae lost. Eyes behind margined with a pale narrow line. Vertex raised and croceous, with four irregular dark spots, one at each corner, connected by the dark surroundings. Across the croceous vertex an interrupted longitudinal dark streak, following the median furrow. Collum and thorax croceous. Prothorax as long as broad, with a deep transverse furrow one third from front, and with a blackish longitudinal median streak. Dorsum of meso- and metathorax margined with an interrupted irregular blackish streak. Thorax blackish ventrally. Abdomen blackish with paler pleurae; hind border of some abdominal segments narrowly margined with yellowish brown. Legs stout and short, croceous, and with blackish bristles. Femora, tibiae and tarsal joints with a blackish band at apex. Spurs hardly as long as basal tarsal joint, which is as long as second and third united, fifth joint hardly as long as second, third and fourth united. Wings without markings. *C* and apical half part of hind margin blackish. Nervures croceous; *Sc* in fore- and hindwings more or less distinctly blackish banded. Pterostigma strongly croceous. Posterior Banksian line in the hindwing distinct; two rows of cells in the basal half part of the area between Cu_{1a} and the Banksian line, three rows

in the apical half part. This line is also present in the hindwings; one row of cells in the area between M_{2a} and the line.

Body 26 mm; forewing 27 mm; hindwing 26 mm.

One specimen from Kimberley district, N. W. Australia, February.

Myrmeleon loweri TILLYARD, Proc. Linn. Soc. N. S. Wales, p. 65, pl. 6, fig. 15, 1916. — One immature specimen present from Kimberley district, N. W. Australia, April.

This species may probably be the same as *M. croceicollis* GERST.; but as long as I know the species of GERSTAECKER only from the description, I should not like to say anything about the question.

Myrmeleon croceus, *Myrm. loweri* TILL. and *Myrm. nigromarginatus* ESB.-P. form a very interesting and rather homogeneous group as to the shape of wings and to the strongly yellowish colour of wings and of part of body. Common characters are the blackish *C* and the blackish apical part of hind margin of the wings; likewise the yellowish coloured nervature. Their head, thorax and sometimes also abdomen are more or less yellowish coloured and with blackish markings; but the markings are liable to vary.

Below I give a single character in tabular form.

1. Two rows of cells in the apical half part of the area between M_{2a} and posterior Banksian line in hindwing, in the basal half part one row *nigromarginatus.*

— In the same area only one row of cells. . . . . 2.

2. Two rows of cells in the apical half part of the area between Cu_{1a} and posterior Banksian line in forewing, one row in the basal half part *loweri.*

— Three rows of cells in the apical half part of the area between Cu_{1a} and posterior Banksian line in forewing, two rows in the basal half part *croceus.*

Callistoleon erythrocephalus (pl. 3, fig. 2). LEACH, Zool. Miscell. I, p. 70, pl. 30, 1814. — Of this species four specimens were present, all from Queensland. 2 ♂♂ from Herberton, 1 ♂ from Atherton, and 1 ♂ from Lamington Plat.

This genus forms with regard to the nervation an interesting connecting-link between the *Myrmeleonini* and the *Acanthaclisini*.

5. Acanthaclisini.

Mestressa subfasciata (pl. 3, fig. 5). *Acanthaclisis subfasciata* BANKS, Proc. Ent. Soc. Wash., p. 141, 1913; ESBEN-PETERSEN, Proc. Linn. Soc. N. S. Wales, p. 61, pl. 13, fig. 27, 1915. — *Mestressa misera* NAVAS, Rev. Real Acad. Madrid, p. 464, fig. 1, 1914. — One male and one female specimen from Kimberley district, N. W. Australia, were present.

It is an interesting genus, which is approaching the *Myrmeleonini*.

Acanthaclisis fundata WALKER, Cat. Neur. Ins. Brit. Mus., p. 320, 1853; ESBEN-PETERSEN, Proc. Linn. Soc. N. S. Wales, p. 61, pl. 7, fig. 8, 1915. — One female specimen from Kimberley district, N. W. Australia.

Acanthaclisis subtendens WALKER, loc. cit. p. 321; ESBEN-PETERSEN, loc. cit. p. 61, pl. 7, fig. 7. — One female specimen from Derby, N. W. Australia, October.

Cosina.

NAVAS, Broteria, p. 47, 1912.

NAVAS erected this genus for *maclachlani* WEELE, and later on he has placed *neozelandica* NAVAS (Memorias, p. 168, 1912) from New Zeeland and *vaga* NAVAS (Ann. Soc. scient. Bruxelles, p. 231, 1914), the patria of which is unknown, in the same. The two last named species are unknown to me; but they cannot be placed in *Cosina*, because *Rs* in the hindwing of these species arises close to base of the wing; there are only 5 crossveins between base of the wing and the origin of *Rs*. In *Cosina*, however, *Rs* in the hindwing arises further out than in any other genus in the *Acanthaclisini*. To *Cosina* I only refer the species *maclachlani* WEELE, *annulata* ESB.-P. (Textfig. 8) and *maculata* ESB.-P.

Cosina maclachlani (pl. 3, fig. 6). WEELE, Notes Leyden Museum, vol. 14, p. 210, 1904. — Of this species four specimens, 2 ♂♂ and 2 ♀♀, were present from Kimberley district, N. W. Australia. One of the male specimens was a very small one; its forewing measured 38 mm, its hindwing 34 mm. The forewing of a rather large female measured 48 mm; the hindwing 43 mm.

Cosina maculata n. sp. (pl. 3, fig. 4). — Face and palpi yellowish. Vertex brownish black, with a pale indistinct transverse streak above the antennae, and with a paler hind margin; it is raised, and with a longitudinal rather broad median furrow. Antennae short, brownish black, narrowly

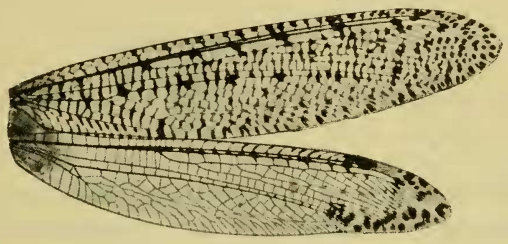


Fig. 8. Wings of *Cosina annulata*.

pale brownish annulated at the joinings; the underside almost yellowish brown towards the apex. Prothorax about as long as broad, with rounded front angles, dark brown with two yellowish spots on the front margin at each side (the smallest close to the front angle) and a yellowish oblique spot on the disc towards the hind angle. A transverse furrow one third from the front margin; the hind margin raised. Meso- and metathorax brownish black. Abdominal segments black; second to eighth segment with a rather broad yellowish band along their hind margins; these bands are almost interrupted at the pleurae, and they are narrower on the underside than on the dorsum. The male appendages as long as eighth and ninth segments united, blackish and with blackish bristles. Head and abdominal segments with short blackish laying hairs, mingled with whitish. Thorax and first abdominal segment with long erected whitish hairs. Legs blackish; the tibiae with a short transverse yellowish streak on their front

part close to the base; intermediate and hind tibiae with a yellowish spot above this streak. Legs with long erected whitish hairs, mingled with a few blackish ones, especially along their upper side. Wings long and slender. Membrane hyaline; nervature almost whitish with a few brownish black interruptions. *Sc* in both pairs of wings yellowish with small dark spots. Forewings with numerous sooty black spots; the hind wing with a few ones.

Body (excl. the anal appendages) 37 mm; anal appendages 3 mm; forewing 42 mm; hindwing 38 mm.

One male specimen from Kimberley district, N. W. Australia, March.

IV. Chrysopidae.

In this family the nervature of the wings is formed in a peculiar manner, and we meet here with a great modification, caused by coalescence.

M forks in the forewing before origin of *Rs;* but in the genera *Chrysopa*, *Anomalochrysa* and *Ankylopteryx* M_2 bends upwards and coalesces with M_1 for a distance. The cell at the base of the median fork takes in these genera form of an irregular triangle. As Mc Clendon[1] and Tillyard[2] have stated M_1 and M_2 run into the hind margin of the wing before its middle. The straight nervure running through the middle part of the wing is formed, partly by M_1 and partly by the coalescing of bent branches from *Rs*. Tillyard names this nervure the pseudo-media (*Psm*). In the genus *Nothochrysa* M_2 does not coalesce with M_1, but it is connected to M_1 by a short crossvein. In the hindwing *M* forks closer to the base than in the forewing, but in a regular manner. M_1 coalesces with the basal part of *Rs* for a short distance. Both M_1 and M_2 run into the hind margin of the wing before its middle, and we find also here a pseudomedia. In both pairs of the wings *Cu* forks before *M*. In the hindwing Cu_1 and Cu_2 both run directly into the hind-

[1] Mc Clendon: Notes on the true Neuroptera, Entom. News, p. 116, 1906.

[2] Tillyard: The Wing-venation of the Chrysopidae, Proc. Linn. Soc. N. S. Wales, p. 221, 1916.

margin; in the forewing Cu_2 only runs directly into the hind margin; Cu_1 coalesces with M_2 before it reaches the hind

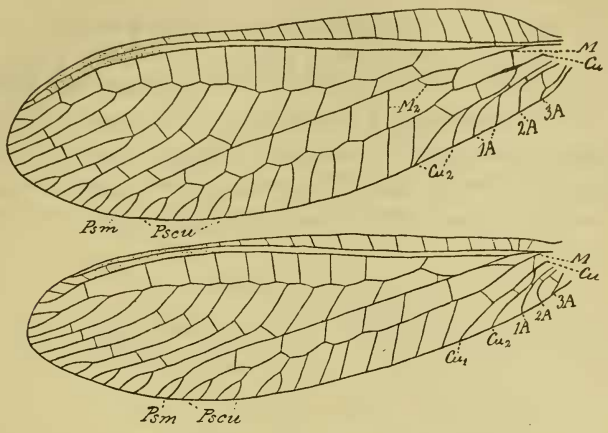


Fig. 9. Wings of *Chrysopa innotata.*

margin. The nervure in both pairs of the wings, running below the pseudo-media and almost parallel to it, is named the pseudo-cubitus (*Pscu*) by TILLYARD, and is also formed

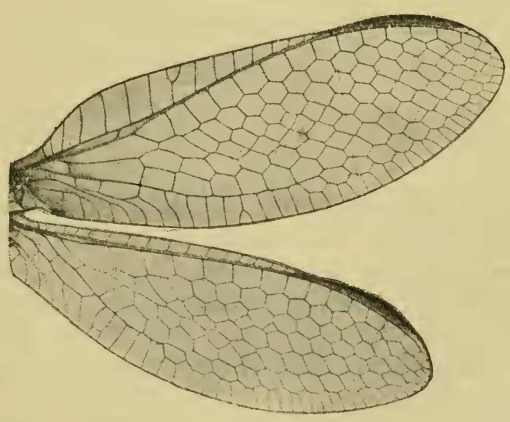


Fig. 10. Wings of *Dictyochrysa fulva.*

by coalescence of several nervures. *1 A*, *2 A* and *3 A* present in both pairs of the wings. In the forewing of *Dictyochrysa fulva* ESB.-P. (Textfig. 10) *M* forks in the usual manner. This

genus may be looked upon as the eldest or the most archaic one in the *Chrysopidae*, and it may be placed in a sub-family *Dictyochrysinae*. In the forewing of this sub-family *M* forks regularly, and its two branches are running parallel for some distance. No pseudo-media is present. In both pairs of the wings the discal area is filled up irregularly by hexagonal cells. In the forewing *2 A* is forked. Two rows of cells between the pseudo-media (rather indistinct) and the pseudo-cubitus in the hindwing. The rest of the Australian genera of the family form a second sub-family, the *Chrysopinae*. In

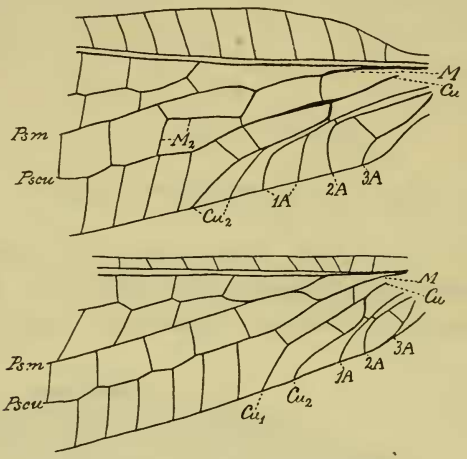


Fig. 11. *Nothochrysa insignis*. Basal part of fore- and hindwing.

the forewing of this sub-family M_2 has an irregular direction. Pseudo-media present. The discal area is filled up by more or less quadrangularly formed cells. Series of gradate veins present. Between pseudo-media and pseudo-cubitus in the hindwing one row of cells. *2* A is unforked in the forewing. The genus *Chrysopa* is undoubtedly the most specialized genus in that sub-family.

Below I give a table of the Australian genera, known to me.

1. In the forewing *M* forks regularly, and its two branches are running parallel at least for the distance of the length of the two basal cells enclosed. No pseudo-media in the

forewing. The nervature of the discal area very dense, and the area filled up by hexagonal cells.

1. *Dictyochrysinae.*

Only one genus *Dictyochrysa* ESB.-P. is known.

— In the forewing *M* is irregularly forked, and a triangular or subquadrangular cell is formed at the base of the fork. Pseudomedia present in the forewing. The nervation of the discal area open, and the cells quadrangular.

2. *Chrysopinae* . . . . . 2.

2. At the base of the median fork in the forewing a subquadrangular cell. Body stout. *Nothochrysa* MAC LACHLAN.

— At the base of the median fork in the forewing a triangular cell. Body more or less slender. . . . . 3.

3. Costal area of forewing very broad in its basal part. Stem of *M* in the forewing strongly curved away from *R*. *Rs* strongly curved, at least in its basal part.
Ankylopteryx BRAUER.

— Costal area of forewing moderately broad in its basal part. Stem of *M* almost straight . . . . . 4.

4. Discal area with two rows of gradate crossveins.
Chrysopa LEACH.

— Discal area with several irregular rows of gradate crossveins. *Anomalochrysa* MAC LACHLAN.

Nothochrysa insignis WALKER, Cat. Neur. Ins. Brit. Mus., p. 267, 1853; *Nothochrysa stictoneura* GERSTAECKER, Mitth. naturw. Vereins Neuvorp. und Rügen, p. 25, 1885; *Nothochrysa insignita* NAVAS, Ann. Soc. scient. Bruxelles, fig. 16, p. 323, 1914. — One specimen from Derby, May, and one from Cosack, June; both localities in N. W. Australia.

This species seems to be a somewhat wide-spread one in Australia. I have seen it from several localities. WALKER's discription of the species is rather insufficient; GERSTAECKER's, however, is excellent. The two oblique streaks on the vertex,

shown in the figure, given by NAVAS, are the two lateral edges of the triangular elevation. These lateral edges are sometimes faintly brownish coloured. In »The Entom. Monthly Mag.», Vol. 24, p. 44 MAC LACHLAN, who has seen the type specimen of WALKER, pointed out that *stictoneura* was synonymous with *insignis*.

Nothochrysa punctistigma n. sp. (pl. 2, fig. 7). — Head and body pale brownish yellow. Head without markings. On the vertex a sharply defined triangular elevation. (In the centre of the triangular elevation an indistinct brownish spot is visible, but I think the spot is wanting when the insect is alive.) Antennae almost as long as the forewing, yellowish and without annulations; basal joint very stout. Eyes bronze-green. Prothorax about twice as broad as long; front angles truncate. A median longitudinal furrow is visible. A transverse furrow one third from the hind margin; the furrow does not reach the lateral margins. A spot close to the front angle and a streak from the end of the transverse furrow towards the hind margin are indicated. Two transversely placed spots are indicated on the front margin of the mesothorax. Above the base of each wing an oblique dark brown streak. Legs yellowish. Membrane of wings hyaline. Longitudinal nervures yellowish. In the forewing *Rs*, pseudomedia and pseudo-cubitus are blackish annulated, where they are touched by the blackish crossveins. Most crossveins in the forewing are totally blackish; but in the hindwing and in the costal area of the forewing they are only blackish at each end. A few crossveins at base of forewing blackish shaded. Pterostigma greyish yellow. At the inner end of pterostigma a small, but very conspicuous, dark brown, or when the wings are held in a certain direction, reddish (sanguineous) brown spot is found, enclosing a crossvein between *Sc* and *R*.

Length of forewing 15 mm; that of hindwing 13 mm.

One male specimen from Broome, N. W. Australia, October.

The species is similar to *N. insignis;* but it is smaller. I think, however, that the peculiar marked pterostigma may easily separate it from the other Australian species.

The specimen before me seems to be somewhat imma-

ture, and there is therefore some reasons to expect that mature specimens may possess the markings here mentioned, more developed, or may possess markings, not mentioned here.

Chrysopa ramburi SCHNEIDER, Monogr., p. 107, tab. 34, 1851; *Chr. vicina* KEMPNY, Verh. zool.-bot. Gesellsch. Wien, p. 353, 1904; *Chr. neutra* NAVAS, Broteria, p. 47, 1910; *Chr. reamuri* NAVAS, Revista Real Acad. Madrid, p. 646, fig. 1, 1914. — This species was well-represented in the collection. Queensland: 1 specimen, Yarrabah; 2 specimens, Chillagoe; 4 specimens, Christmas creek. N. W. Australia: 2 specimens, Broome; 11 specimens, Kimberley district, February.

It was very interesting to see that this wide-spread Australian species to some extent was liable to vary. The smallest specimen (Kimberley) measured 20 mm in expanse of forewing, the largest one (Christmas creek) 33 mm. In some specimens the basal antennal joint was unmarked, in other specimens it was marked with a dark (reddish) dorsal stripe, but in most specimens both a dorsal and a lateral streak were found. In several specimens the two dark oblique streaks on the vertex were wanting, or only indicated by two small dots. In other specimens the crossveins and anal veins of the forewings were quite pale, but this was, as far as I could see only due to the lesser degree of maturity.

Chrysopa signata SCHNEIDER, Monogr., p. 109, tab. 35, 1851. — Of this species a fine series of specimens was present. N. W. Australia: 7 specimens, taken in February, from Kimberley district. Queensland: 1 specimen, Christmas creek, November; 1 specimen Bellenden Ker; 1 specimen, Yarrabah; 2 specimens, Atherton. W. Australia: 2 specimens, taken in September, from Freemantle.

Chrysopa innotata WALKER, Cat. Neur. Ins. Brit. Mus., p. 254, 1853. — Only present from N. W. Australia. 2 specimens from Noonkanbah, December, and 2 specimens from Kimberley district, April.

Chrysopa olatatis BANKS, Psyche. Vol. 17, p. 101, 1910. — Of this interesting species one specimen was present from Yarrabah, Queensland.

The species is easily recognized by its conspicuous reddish brown pterostigma in the hindwing. The nervature of the wings pale.

Chrysopa otalatis BANKS, loc. cit. p. 102. — This species was only present from Queensland, but rather numerous.

1 specimen, Cape York; 1 specimen (alcohol), Malanda, June; 1 specimen (alcohol), Evelyne, August; 9 specimens, Bellenden Ker, May; 7 specimens, Yarrabah, June; 16 specimens, Colosseum.

The species is nearly allied to our European *Chr. vulgaris*.

V. Apochrysidae.

HANDLIRSCH, Die foss. Ins. und Phyl. rezent. Formen, p. 1251, 1908.

Rs in the forewing arises close to the base of the wing. *M* apparently unforked in the forewing, but forked in the hindwing as in the *Chrysopidae*. *Cu* forked close to the base in both pairs of the wings. Pseudo-media and pseudo-cubitus present in fore- and hindwing and running very close to each other. From the tip of pseudo-media + pseudo-cubitus a row of gradate crossveins is running parallel to the apical margin upwards to the tip of *R*. The discal area and the marginal area of the wing are distinctly separated. The marginal area very broad. *1A*, *2A* and *3A* present. The wings, at least the forewing, very broad. Antennae very long. Body and legs slender.

The two main-characters, separating the *Apochrysidae* from the *Chrysopidae*, is firstly the apparently unforked *M* in the forewing, and secondly the distinct separation of the discal and the marginal area of the wing. With regard to the first named character, I think, however, that when the pupal tracheation of the forewing may be examined, we would also here meet with a furcation of *M*. If so, it seems to me that the *Apochrysidae* ought to be placed in the *Chrysopidae* as a sub-family. I consider the *Apochrysidae* to be a more specialized group than the *Crysopidae*.

Oligochrysa gracilis ESBEN-PETERSEN, Proc. Linn. Soc. N. S. Wales, p. 639, pl. 73, fig. 4, 1915. — Of this species one specimen (in alcohol) was present from Malanda, Queensland, January.

Another species belonging to the Austro-Malayan fauna is *Apochrysa phantoma* GERSTAECKER (Mitth. nat. Ver. f. Neuvorp. u. Rügen, p. 153, 1893). I know the species from New Guinea and Aru Islands. NAVAS has described *phantoma* as

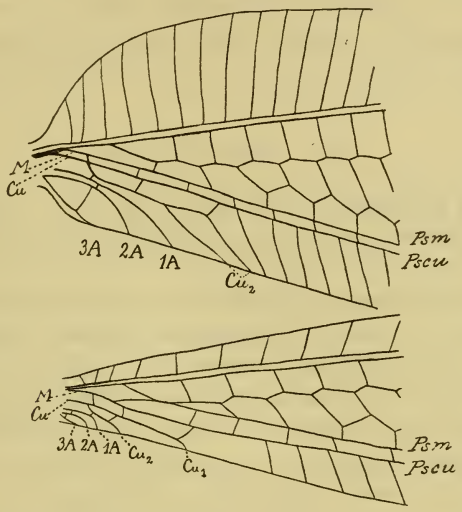


Fig. 12. *Oligochrysa gracilis*. Basal part of fore- and hindwing.

Nobilinus insignatus (Ann. Soc. scient. Bruxelles, p. 295, 1914); but I think the genus *Nobilinus* is synonymous with *Synthochrysa* NEEDHAM (Records of the Indian Museum, p. 202, 1909), the geno-type of which is *Hemerobius stigma* GIRARD (Ann. Soc. Ent. France, p. 609, pl. 9, fig. 6, 1862) from New Caledonia.

VI. Sisyridae.

Sisyra brunnea (pl. 2, fig. 5). BANKS, Proc. Ent. Soc. Wash., p. 76, 1909; *Sisyra rufistigma* TILLYARD, Proc. Linn. Soc. N. S. Wales, p. 314, pl. 16, fig. 26, 1916. — Three specimens kept in alcohol from Cedar creek, Queensland. I pos-

sess two specimens of TILLYARD's type-series in my collection. I have compared them with the specimens of Dr. MJÖBERG, and I am sure that the species name of TILLYARD may be put amongst those of the synonyms. One of the specimens from Cedar creek has the apical part of the antennae pale as mentioned by BANKS; in the second specimen the antennae were uniformly coloured; the third specimen has lost its antennae. In the forewing of one specimen the oblong dark streaks between the longitudinal nervures are easily observable; in the forewing of the two other specimens those streaks were hardly visible. The colour of pterostigma reddish brown.

VII. Berothidae.

Berotha mjöbergi n. sp. (pl. 2, fig. 6). — Head and antennae (the apical part lost) yellowish red. Between clypeus and face a transverse dark furrow. Vertex with a dark spot above each antenna and close to the margin of the eye. Basal joint of antennae somewhat thicker than the other joints and about as long as second and third united. Thorax reddish yellow. Prothorax as long as broad, with rounded front angles, and with two brown spots towards each side margin. Front margin of mesothorax with a large brown median spot; a brown spot above the base of each fore- and hindwing. Abdomen reddish brown dorsally, yellowish ventrally. Legs pale, with some darker indistinct annulations. Wings short and broad, and with strongly rounded apex. Membrane of wings hyaline, that of forewing with a faintly reddish yellow tinge. Longitudinal nervures yellowish, those of forewings reddish brown annulated; the annulations more or less brownish shaded. One third from base of forewing those shades have a tendency to form a transverse dark band, arising from the hind margin. Most crossveins a little darker than the longitudinal veins. Three dark crossveins present in the radial area of the forewing, two in the hindwing. Four branches from *Rs* in both pairs of the wings. Body, legs and wings with long pale hairs.

Length of forewing 6 mm; that of hindwing 5 mm.

One female specimen from Kimberley district. N. W. Australia, November.

The species has much likeness to *B. neuropunctata* ESBEN-P. (Proc. Linn. Soc. N. S. Wales, p. 213, 1917) from N. S. Wales; but I have compared the types, and the two species are distinct. The hind margin of the apical part of the forewing in *neuropunctata* is straight; in *mjöbergi* rounded.

It may be remarked that the *Berothidae* want a thorough revision.

VIII. Hemerobiidae.

Notiobiella obliqua (pl. 2, fig. 4) BANKS, Proc. Ent. Soc. Wash., p. 81, 1909. — One specimen present, Mt. Tambourine, Queensland.

Drepanacria humilis MAC LACHLAN, Journ. Ent. London, p. 111, 1863. — One specimen from Freemantle, N. W. Australia, September. The specimen belongs to the pale form.

Micromus tasmaniae WALKER, Trans. Ent. Soc. Lond., p. 201, 1859. *Micromus australis* FROGGATT, Agric. Gazette of N. S. Wales, 1904. *Micromus Froggatti* BANKS, Proc. Ent. Soc. Wash., p. 77, 1909. — This species seems to be a rather wide-spread one in Australia. Queensland: 3 specimens, Cedar creek; 1 specimen, Malanda, January. N. W. Australia: 2 specimens, Freemantle, September. New South Wales: 1 specimen, Sydney, November.

IX. Psychopsidae.

Psychopsis cælivagus WALKER, Cat. Neur. Ins. Brit. Mus., p. 279, 1853; W. W. FROGGATT, Proc. Linn. Soc. N. S. Wales, p. 455, pl. 21, fig. 8, 1903. — One specimen from Cedar creek, Queensland, was present. It is a fine and beautiful insect, and it seems to be very scarce. Length of forewing 12 mm; that of hindwing 10 mm.

Fig. 13. Wings of *Psychopsis cælivagus*.

X. Mantispidae.

Theristria felina GERSTAECKER, Mitth. naturw. Vereins f. Neuvorp. u. Rügen, p. 44, 1884. — One specimen, Alice River, September; one specimen, Cook Town, September, both localities in Queensland.

Mantispa strigipes WESTWOOD, Trans. Ent. Soc. London, p. 259, 1852. — One specimen, Geraldton, 30.9. 1910, W. Australia. It is with some hesitation that I refer that specimen to the species of WESTWOOD; but the differences are so small and insignificant that I do not like to describe it as a new species.

Mantispa (Austromantispa) imbecilla GERSTAECKER, Mitth. naturw. Ver. f. Neuvorp. u. Rügen, p. 41, 1884. *Mantispa pullula* BANKS, Psyche, Vol. 17, p. 104, 1910. *Necyla Doddi* NAVAS, Revista Real Acad. Madrid, p. 651, 1914. — Queensland: 1 specimen, Cape York, August; 1 specimen, Alice river, September; 1 specimen, Mt. Tambourine; 1 specimen, Atherton, May; 1 specimen, Colosseum. N. W. Australia: 1 specimen, Noonkanbah, December.

The species differs in some degree with regard to the size and the markings. The smallest specimen measured 13 mm in expanse of forewings; the largest 20 mm. The markings on the head and on the prothorax and the colour of the nervature and of the pterostigma differ as to the degree of maturity. I possess a specimen of BANKS's type-series of *M. pullula* from Port Darwin, and I am quite sure that the specimen is *imbecilla*. That *Necyla Doddi* also is synonymous with *M. imbecilla* is undoubted.

XI. Coniopterygidae.

Coniopteryx maculithorax ENDERLEIN, Zool. Jahrb., p. 204, pl. 4, fig. 5, 1906. — 2 ♂ and 2 ♀ from Evelyne, August; 1 ♂ (immature) from Cedar creek, March; both localities in Queensland. All the specimens in alcohol. ENDERLEIN mentions the species from New South Wales.

Parasemidalis farinosa ENDERLEIN, loc. cit., p. 222, pl. 6, fig. 22. — 1 ♀, kept in alcohol, from Broome, W. Australia, 10. June. ENDERLEIN mentions the species from N. S. Wales.

Parasemidalis fulvinervosa n. sp. — Head brownish yellow. Antennae pale brown and almost as long as the hindwings, 35-jointed. Prothorax very pale, almost white. Meso- and metathorax pale brown. Underside of thorax and

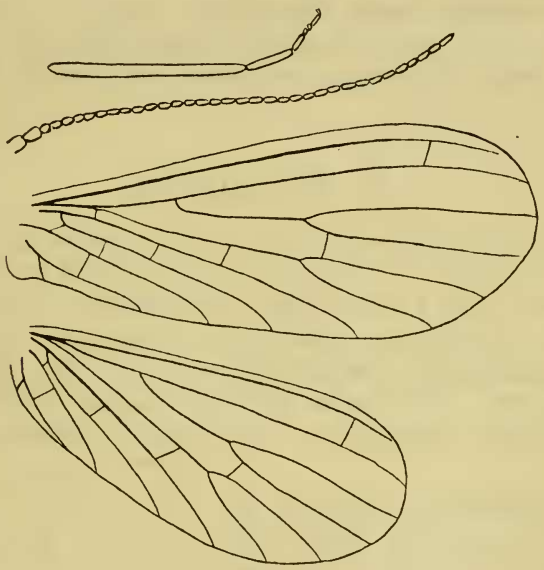


Fig. 14. *Parasemidalis fulvinervosa.* Hind tibia and tarsus, antenna and fore- and hindwing. (Tibia, tarsus and antenna a little more enlarged than the wings).

femora pale brown. Tibiae and tarsi yellowish brown. Legs very slender. Abdomen lost. Membrane of wings quite hyaline. All the longitudinal nervures and the crossveins yellowish. Length of forewing 2 mm.

One specimen, kept in alcohol, from Kimberley district, N. W. Australia.

I place the species in the genus *Parasemidalis* ENDL. although I see very well that, with regard to the nervation, it differs highly, because the crossvein between *R* and *Rs* is wanting in both pairs of wings. This fact is quite exceptional

in the *Coniopterygidae*. I have examined the unique specimen very carefully under the microscope, but I was not able to find any indication of crossvein. Probably the specimen, with regard to the nervation, is an anomalous one, and if so, the species may be placed in the genus *Parasemidalis;* but in case that the crossvein between *R* and *Rs* in reality should prove to be wanting, a new genus must be introduced for the species.

Heteroconis varia ENDERLEIN, loc. cit., p. 229, pl. 6, fig. 25. — 1 ♀, kept in alcohol, from Cedar creek, Queensland, March. ENDERLEIN mentions the species from N. S. Wales.

B. Mecoptera.

This order, of which several very interesting and archaic forms are found in Australia, was represented by two species, both belonging to the genus *Harpobittacus* GERSTAECKER (Mitth. nat. Vereins f. Neuvorp. u. Rügen, p. 119, 1885).

Harpobittacus australis KLUG, Abh. Kön. Akad. Wiss., p. 100, 1836. — Two males and eight females from Freemantle, W. Australia, September. One female, Adelaide, October.

Harpobittacus tillyardi ESBEN-PETERSEN, Ent. Medd., Köbenhavn, p. 240, 1915. — One male and one female, Cedar creek, April; two females, Lamington Plat; one female, Evelyne; all the localities in Queensland.

This species has hitherto been overlooked on account of its great likeness to *H. australis*, from which it may, however, be separated by the shape of appendages of the male and by the markings on the abdomen. In the male of *H. tillyardi* the hind border of second to sixth segment is narrowly blackish dorsally; seventh seg-

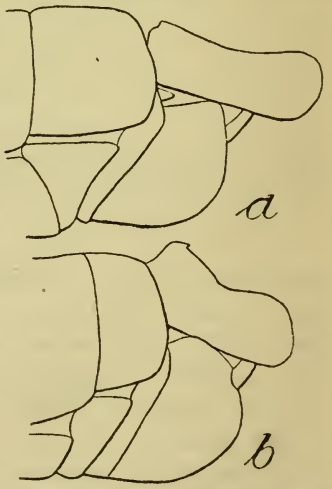


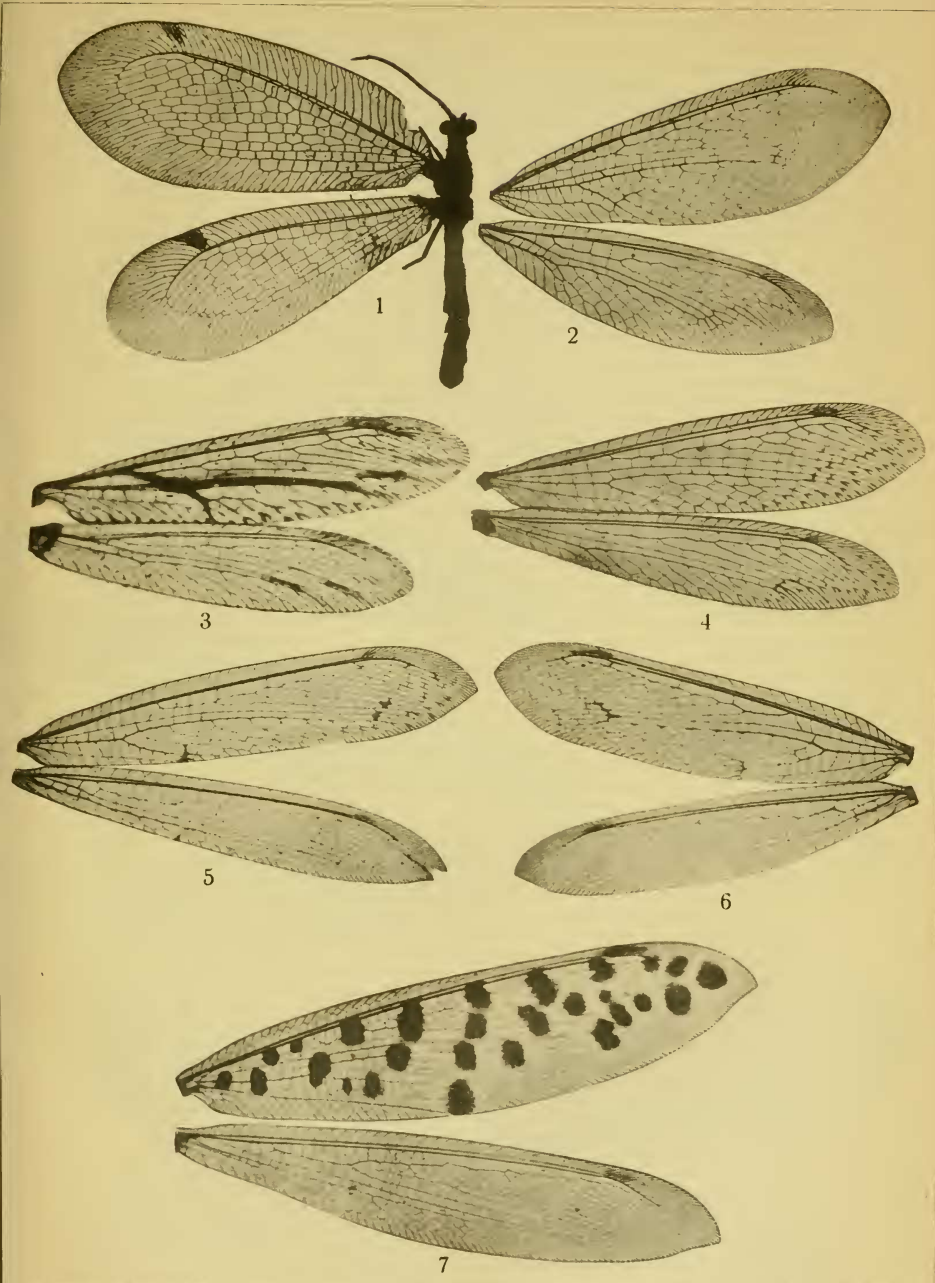
Fig. 15. Anal appendages of male, seen from side.
a *Harpobittacus australis.*
b *H. tillyardi.*

ment quite black above; eighth and ninth yellowish brown above. In the female the hind border of second to fifth segment is narrowly blackish dorsally; sixth and seventh totally black above; eighth partly black dorsally; ninth reddish brown. In the male of *H. australis* the hind border of second to fifth segment is narrowly blackish above; sixth and seventh quite black above; eighth and ninth reddish brown. In the female the hind borders of second to fourth segment are narrowly blackish dorsally; fifth, sixth, seventh and front part of eighth totally black above; apical half part of eighth and whole the ninth segment reddish brown above.

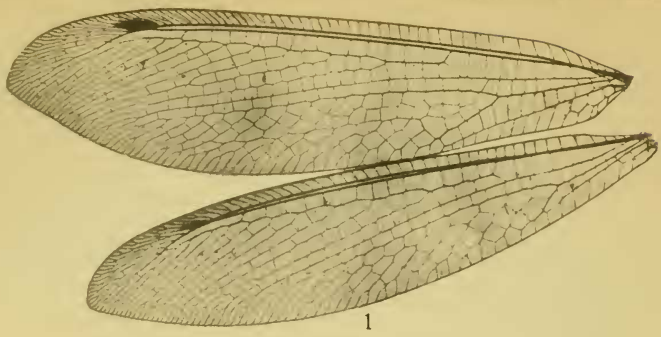
The anal appendages of both species pale brown.

Tryckt den 3 december 1918.

Uppsala 1918. Almqvist & Wiksells Boktryckeri-A.-B.



Cederquists Graf. A.-B., Sthlm.



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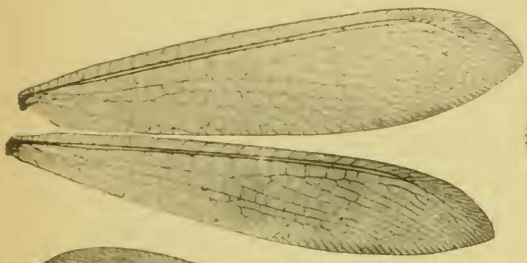

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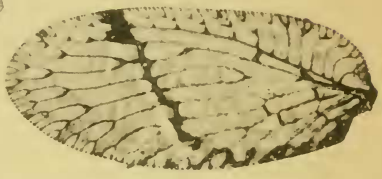

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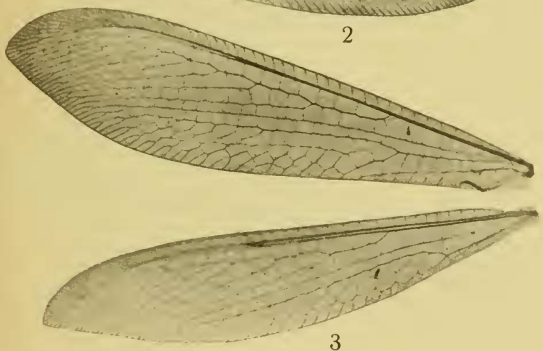

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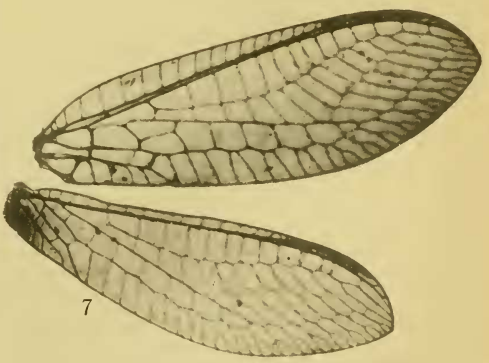

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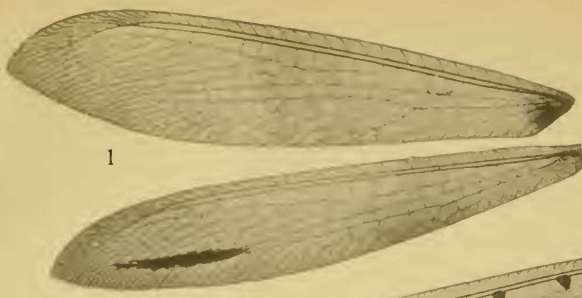

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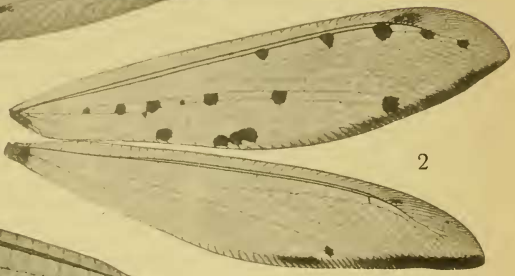

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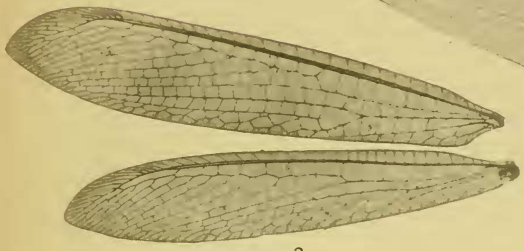

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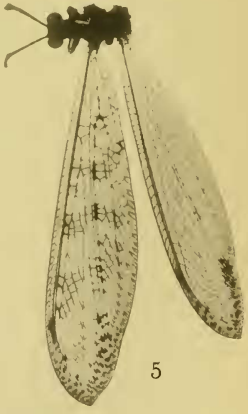

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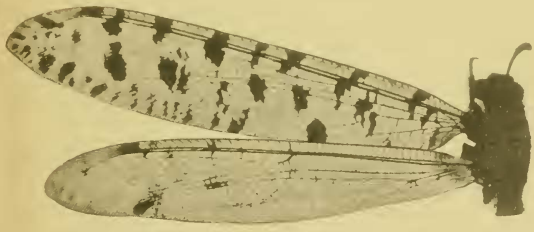

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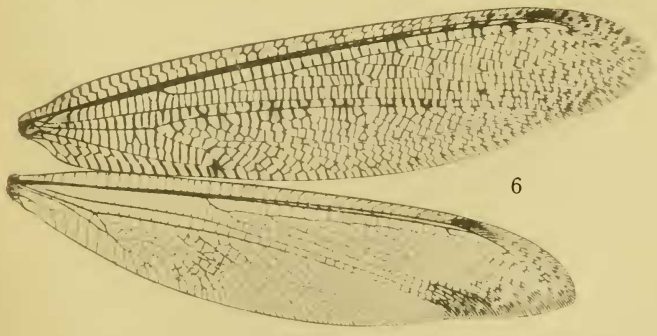

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